Why EDSA should be Made a One-Way and Paired with C-5 and C-4.

My Short History

On August 30, 2016 at the start of President Duterte's presidency, I wrote a letter to the President together with my study on the traffic congestion in MetroManila particularly EDSA. On October 10, 2016 Department of Transportation (DoTr) responded to my letter indicating agreement to most of my proposals in my study. The one-way paired road of EDSA and C-5/C-4 proposal in Figure 1.0 was subjected for review by DoTr but no action was done until today. (For Complete Details See Attachment 1.0)

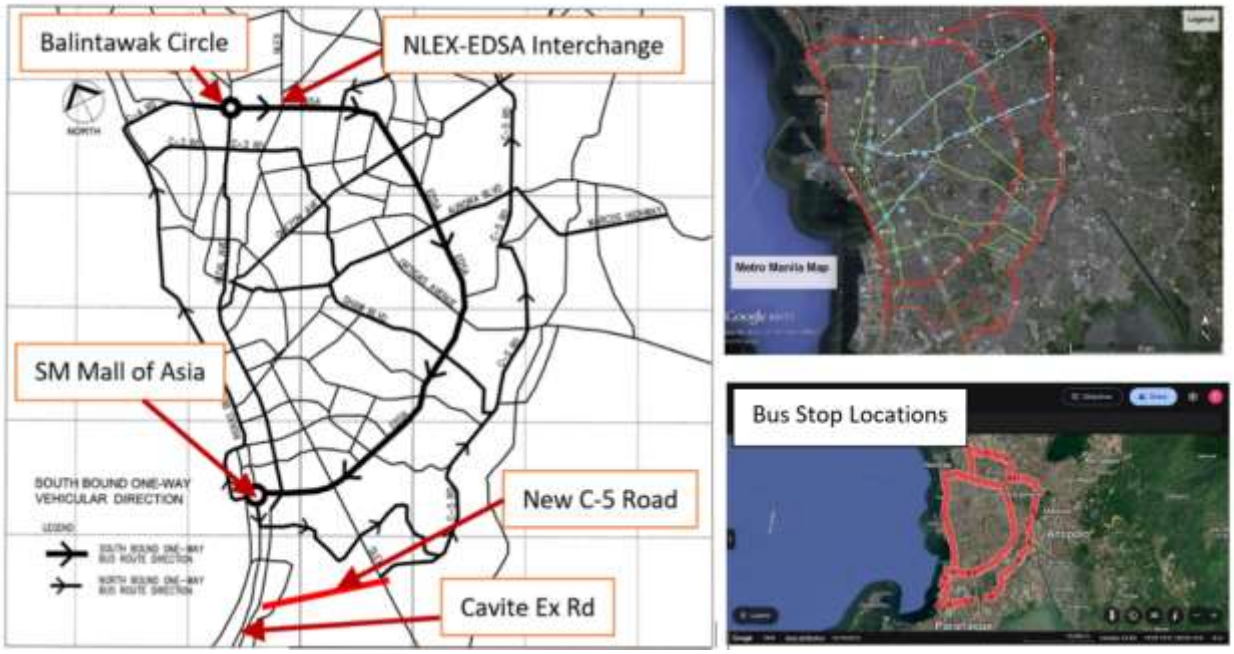
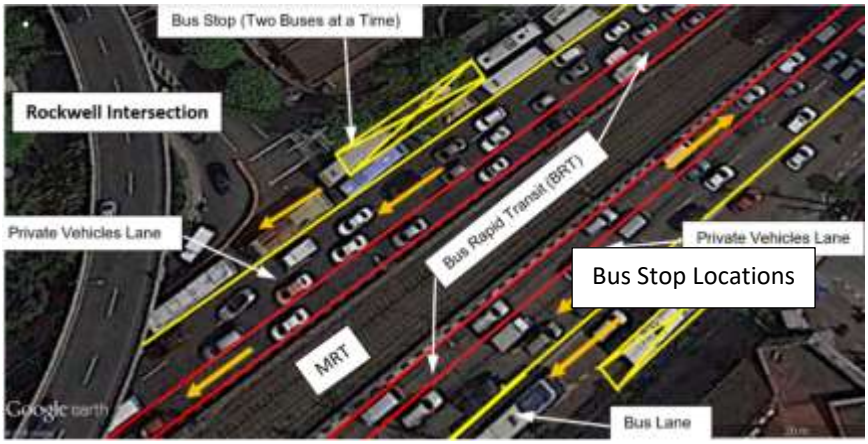


Figure 1.0

The only concept that was implemented today was the bus "carousel" that was not the same as a bus rapid transit (BRT) concept that I proposed (Refer to Attachment 2.0).



August 30, 2016

In 2019 I made a presentation to MMDA under Chairman Danny Lim on a One-Way EDSA traffic route system paired with C-5 and R-4 between the Balintawak-MOA route. This was in principle accepted by MMDA. It was recommended to the Metro Manila Council but was rejected. This concept was presented to media via interviews in ANC and GMA.

Stand for Truth: EDSA, gagawing one-way na kalsada?!
22,912 views 3y ago ...more
GMA Public Affairs 20.7M

I was thinking then that the government was serious in addressing the MetroManila traffic congestion after my proposal was recommende to the Metro Manila Council that I decided to purchase a traffic modelling software “AIMSUN” worth Php 300,000.00 with the intention to seriously help the government solve the traffic congestion in MetroManila for free. I started the traffic modelling for EDSA but unfortunately the Covid-19 occurred in 2020. AIMSUN is currently used in Singapore and in many major countries to model any traffic situation that creates congestions with the purpose of providing solutions.

A. Basic Traffic Principles that Should be Applied in EDSA and MetroManila Roadways

In cities that are highly urbanized and populated such as Manila, Singapore and Hongkong there will be always traffic congestion. Unlike Manila, congestion in Singapore and Hongkong is minimized by following the basic principles of solving traffic cogestion:

1. The basic principle that is accepted by all traffic authorities is that traffic "**congestion results from an imbalance in the supply of and demand for road space.** This means, reducing traffic congestion is either increasing the supply of road space or reducing the demand of peak-hour automotive travel"[1].
   However, this principle is not entirely true based on statistics and experiences by various megacities that by **'increasing the supply of road space" 'alone', will in the long run create more traffic congestion as explained by Todd Litman**[2]. In Singapore, skyways are not built as a solution to solve traffic congestion. At most flyover roads are build. Singapore extensively uses underutilized roads by pairing one-way streets. Many roads in Metro Manila are underutilized. In the case of the Makati Business District (MBD) upon advice of Japanese traffic consultants' business traffic congestion was largely be relieved by adopting one-way paired streets. Until today Makati Business District has avoided traffic gridlocks.

2. The second principle is with the traffic congestion in EDSA at its peak**,** is **"managing the demand for roadways during peak hours offers the greatest prospects for reducing congestion"[3].** Where **'**managing' means balancing the supply and demand for space at peak congestion period. Singapore's act was to address the supply side of transport facilities first by increasing urban transport capacity to its maximum then manage the demand side for road space thru efficient use of existing transport facilities (road space) in congested central areas [Lim Yan Luan]. In contrast, Manila's solution to traffic congestion is to by-pass congested or over capacity transport road space by constructing elevated roadways (skyway) **instead of managing the existing road space**. Metro Manila has reached its peak transport capacity and is about time to use under-utilized roadways instead of building aboveground roadways.

B. EDSA's Traffic Congestion

EDSA was completed in 1940 by then President Manuel Quezon uder the name Highway 54. In June 20, 1953 the Phlippine Congress passed Republic Act 917 known as the

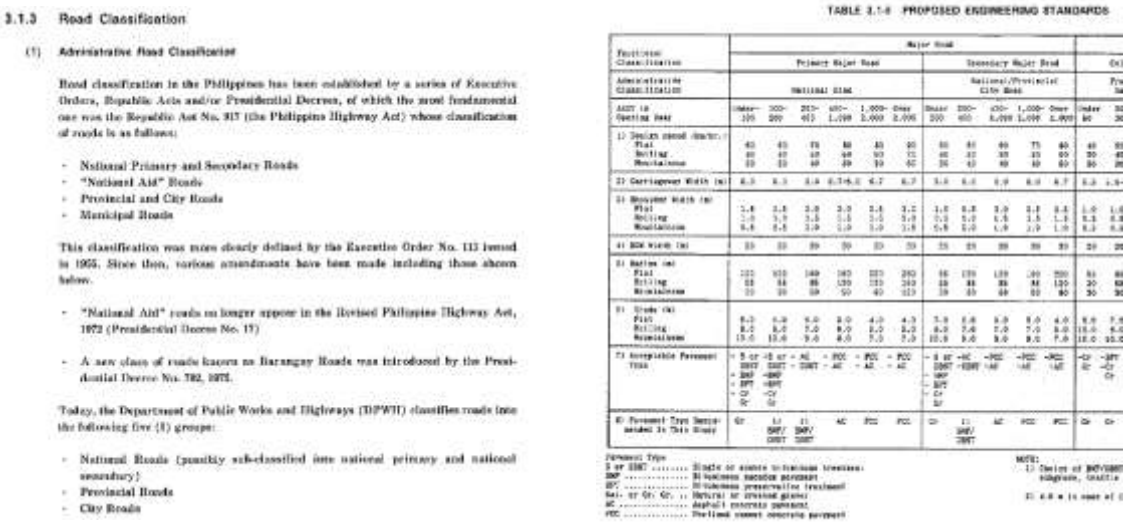
---

[1] RAND Corporation Report "Reducing Traffic Congestion in Los Angeles California" by Paul Sorensen, Martin Wachs, Endy M. Daehner, Aaron Kofner, Liisa Ecola, Mark Hanson, Allison Yoh, Thomas Light, James Griffin

[2] SMAR TER CONGESTION RELIEF IN ASIAN CITIES *Win-Win Solutions to Urban Transport Problems* by Todd Litman for the United Nations Economic and Social Commission for Asia and the Pacific [TRANSPORT AND COMMUNICATIONS BULLETIN FOR ASIA AND THE PACIFIC No. 82 Combatting Congestion] ESCAP

[3] RAND Corporation Report "Reducing Traffic Congestion in Los Angeles California" by Paul Sorensen, Martin Wachs, Endy M. Daehner, Aaron Kofner, Liisa Ecola, Mark Hanson, Allison Yoh, Thomas Light, James Griffin

Philippine Highway Act. This Act created standard roadway lanewidth ranging from 3.0 meters to 3.35 meters. The international standard today is 3.6 meters.



3.1.3 Road Classification

(1) Administrative Road Classification

Road classification in the Philippines has been established by a series of Executive Orders, Republic Acts and/or Presidential Decrees, of which the most fundamental one was the Republic Act No. 917 (the Philippine Highway Act) whose classification of roads is as follows:

- National Primary and Secondary Roads
- "National Aid" Roads
- Provincial and City Roads
- Municipal Roads

This classification was more clearly defined by the Executive Order No. 113 issued in 1955. Since then, various amendments have been made including those shown below.

- "National Aid" roads no longer appear in the Revised Philippine Highway Act, 1972 (Presidential Decree No. 17)
- A new class of roads known as Barangay Roads was introduced by the Presidential Decree No. 702, 1975.

Today, the Department of Public Works and Highways (DPWH) classifies roads into the following five (5) groups:

- National Roads (possibly sub-classified into national primary and national secondary)
- Provincial Roads
- City Roads

TABLE 3.1-6 PROPOSED ENGINEERING STANDARDS

Figure 1.0 Lanewidth Standard 1953

The follwing pictures taken from Goggle Earth would show that the lanewidth in EDSA varies from 2.63 meters to a maximum of 3.5 meters approximately. The number of lanes for each two-sides is 5-lanes each. The average lanewidth is 3.065 meters. In Singapore the minimum lanewidth is 3.2 meters. In terms of lanewidth, some EDSA lanewidth is still within the international standard of 3.6 meters[4] in Figure 2.0 (Exhibit 12-9).

EXHIBIT 12-9. REQUIRED INPUT DATA: TWO-LANE HIGHWAYS

Required Data	Default
Geometric Data	
Highway class	Exhibit 12-10
Lane width	3.6 m
Shoulder width	1.8 m
Access-point density	Exhibit 12-4
Specific grade or general terrain	Level
Percent no-passing	Exhibit 12-11
Base FFS	-
Length of passing lane	Exhibit 12-12
Demand	
Length of analysis period	15 min
PHF	0.88 rural, 0.92 urban
Directional split	Exhibit 12-13
Heavy vehicles percentages	Exhibit 12-14

Figure 2.0 Source: Highway Capacity Manual[5]

[4] Highway Capacity Manual, Transportation Research Board, National Research Council Transportation Research Board 2000, Executive Committee Chairman Martin Wachs, Director Institute of Transportation Studies and et a, University Of California, Berkeley, CA

[5] Ibid 4

Figure 3.0 Google Earth

The importance of the lane width in international standards is, it regulates the maximum speed allowed for a road. In DPWH standard for flat road (highways in urban centers), the maximum vehicle speed for a 3.35 meters lane width is 90 kph. At 3.0 meters lane width the maximum speed is 60 kph. This means if the lane widths in EDSA are not consistent there will be certain sections in EDSA that will slow-down the vehicles eventually cause traffic congestion. An example is the Guadalupe Makati bridge with a lane width of 2.6 meter with an island of 0.6 meters the resulting lane width is 2.0 meters (Figure 13.0). Compare this with the 3.5 meters lane width at Rockwell (Figure 4.0). This was my purpose of making the EDSA a One-Way Street to keep the lane width consistent throughout the whole stretch of EDSA and at the same time if possible, widen the pedestrian sidewalks.

Figure 4.0 Google Earth

Figure 5.0 Google Earth

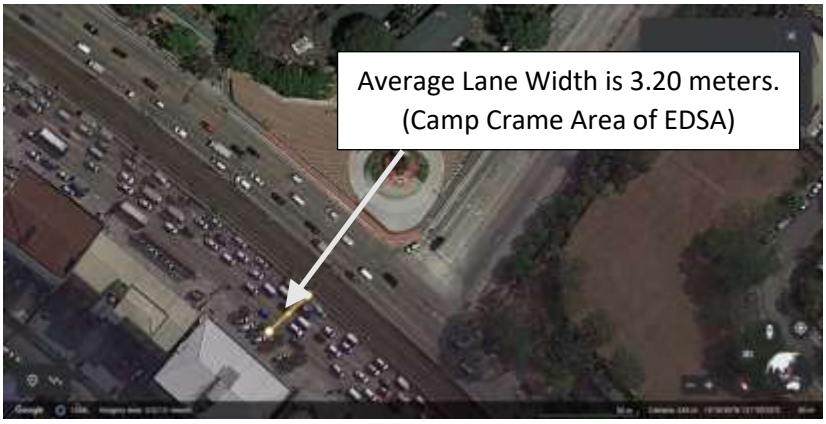


Figure 6.0 Google Earth

Figure 7.0 Google Earth

Principle 1 "**Congestion results from an imbalance in the supply of and demand for road space".**

The following pictures will show that the traffic congestion in EDSA is cause by the lack of supply and a large demand for road space cause by the increase in vehicular volume in lanes that were redirected to avoid intersections. This happens in most intersections in EDSA.

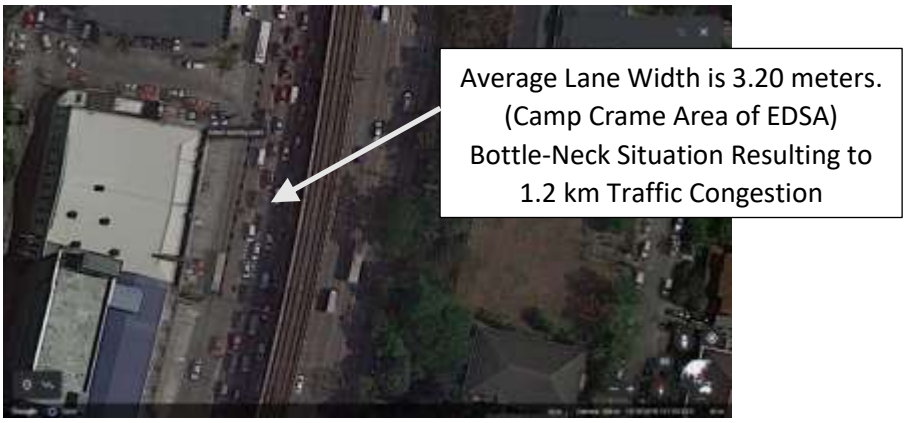


Figure 8.0 Google Earth

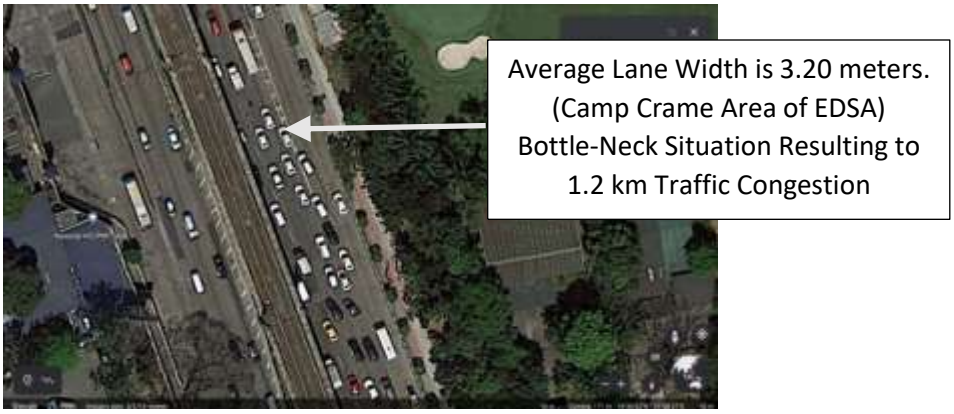


Figure 9.0 Google Earth

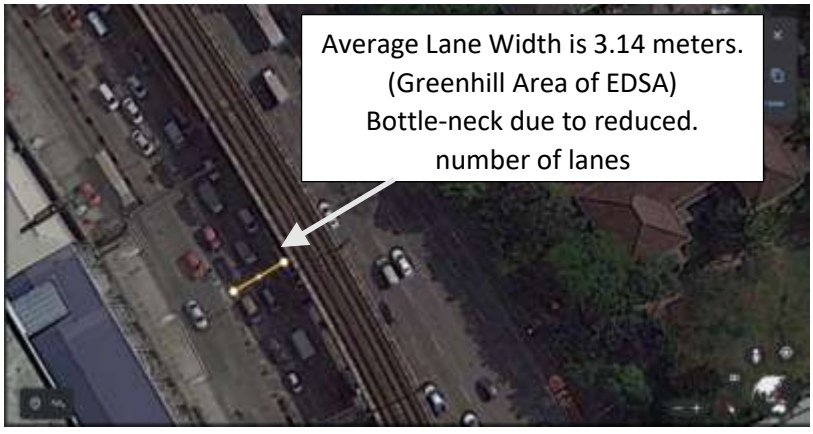


Figure 10.0 Google Earth

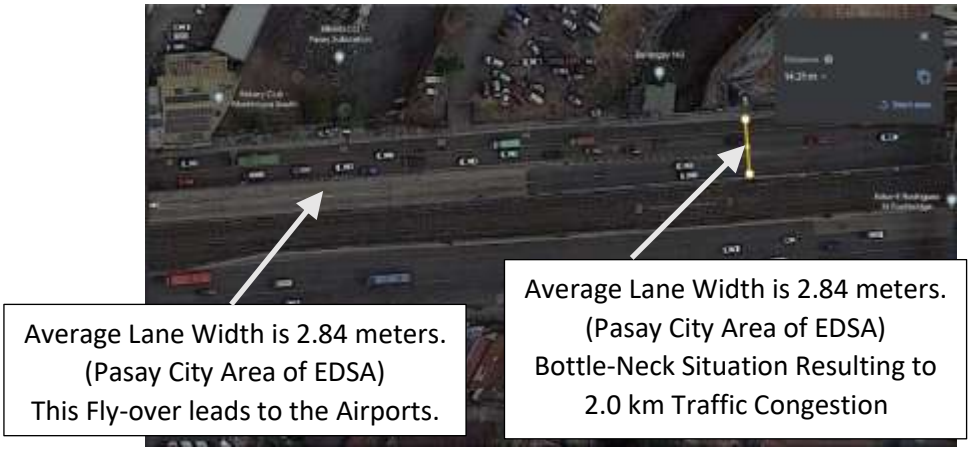


Figure 11.0 Google Earth

In one case along the Pasig River bridge in Guadalupe the lane width was only 2.63 meters caused by an island on the bridge. An SUV vehicle is about 1.90 meters wide without the side mirror leaving a space between vehicle of about 365 mm.

Figure 12.0 Google Earth

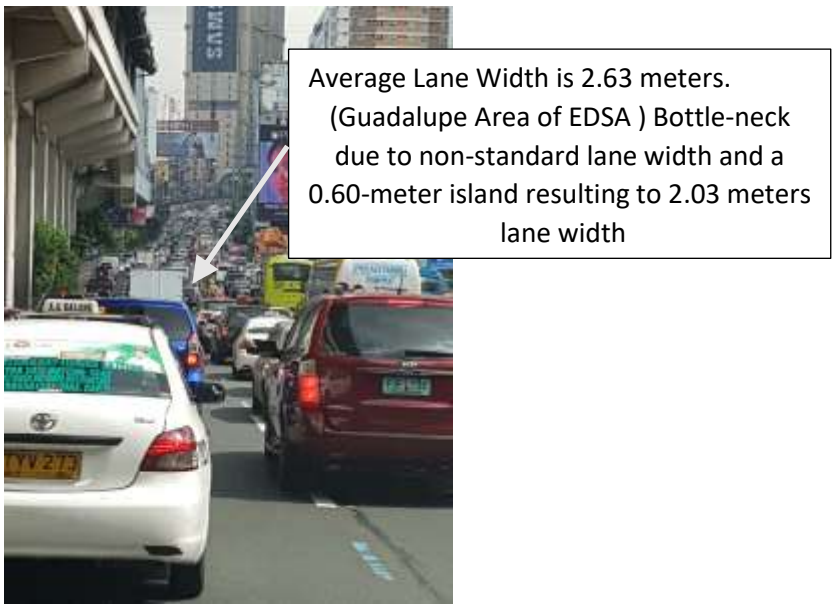


Figure 13.0

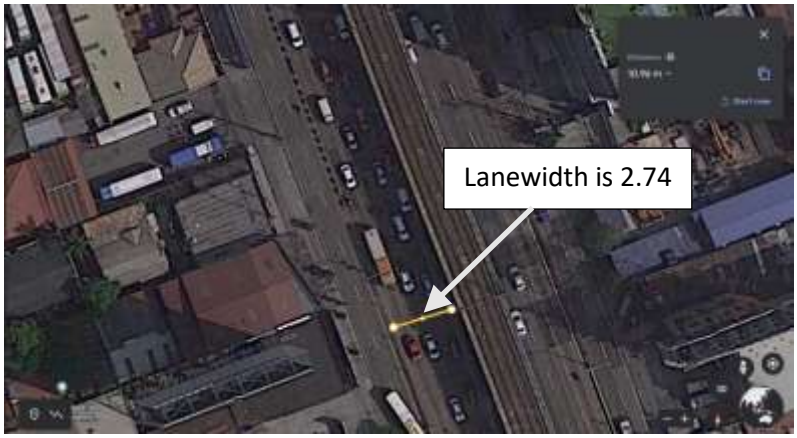


Figure 14.0 Google Earth

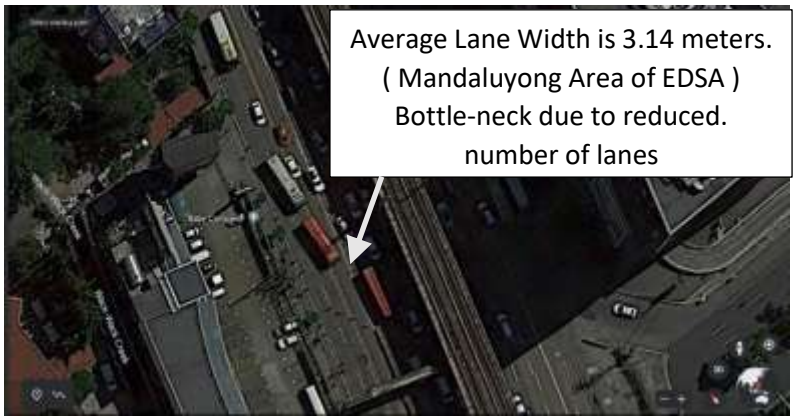


Figure 15.0 Google Earth

Another case of demand and supply for road space is the intersection in-front of SM North and EDSA-Munoz intersection where vehicular traffic was re-directed to flow along EDSA instead of crossing across EDSA. This traffic diversion caused vehicles to make a U-turn along EDSA causing traffic obstruction and congestion due to lack of road space.

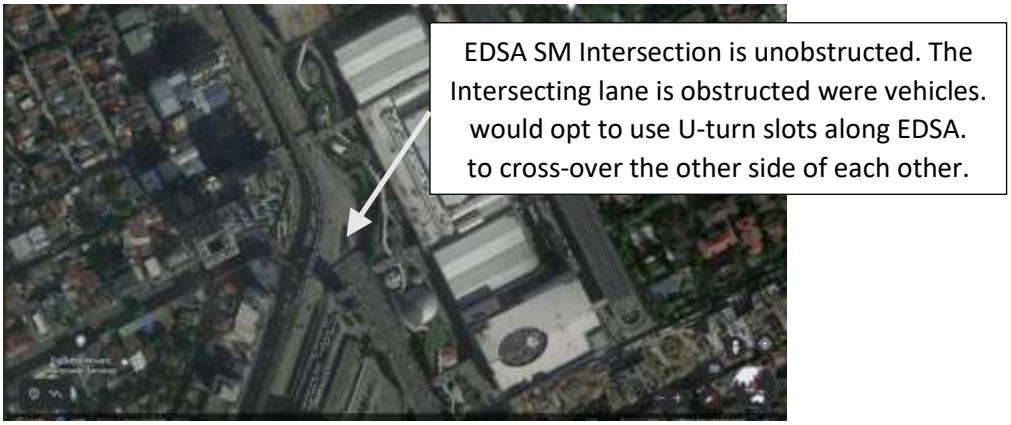


Figure 16.0 Google Earth

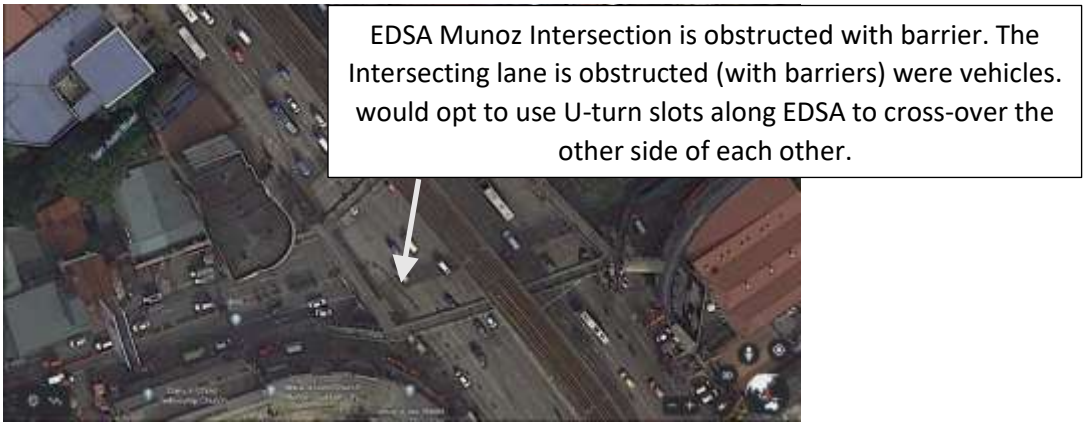


Figure 17.0 Google Earth

In some cases, the roadway on EDSA are restricted due to the physical infrastructure such as interchanges that reduce the lanes from 5-lanes to 3-lanes and sometimes to two lanes. And in most cases the lanes are diverted to serve other roadways instead of going thru the whole roadway lane of EDSA.

The road infrastructure methodology in our country should be guided by international practices. EDSA is a case where the roadway traffic principles has not been implemented and at worst was violated. At the present vehicular volume, a two-way roadway is no longer feasible for EDSA. Eight years ago, I proposed to convert EDSA into a one-way roadway paired with C-5 and R-4 coupled with an efficient Metro-wide city bus system. I believe it is more urgent to implement it now. By-passing the Metro-city streets by constructing above-ground highways will not solve the traffic congestion. Today the much-heralded solution to EDSA traffic congestion, the North-South Connector Skyway,

failed to even improve the traffic situation in EDSA. In the next three years the SLEX and the Skyway will be a major contributor to the worsening traffic congestion in Metro Manila. Even today, the south and north bound SLEX after Alabang-Muntinglupa is starting to be the next traffic congestion after EDSA.

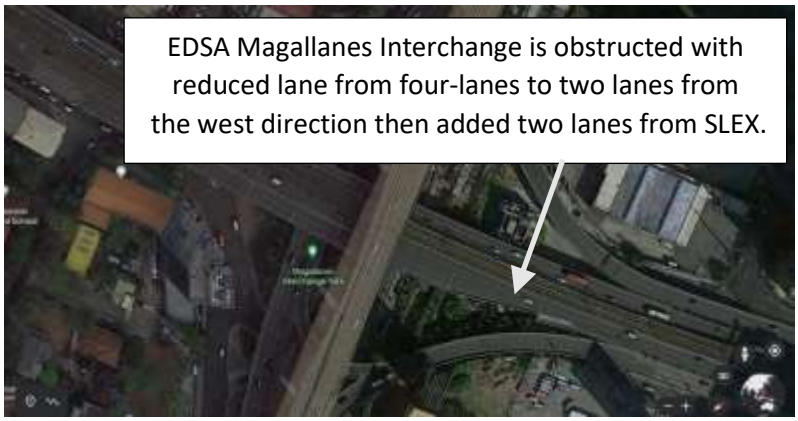


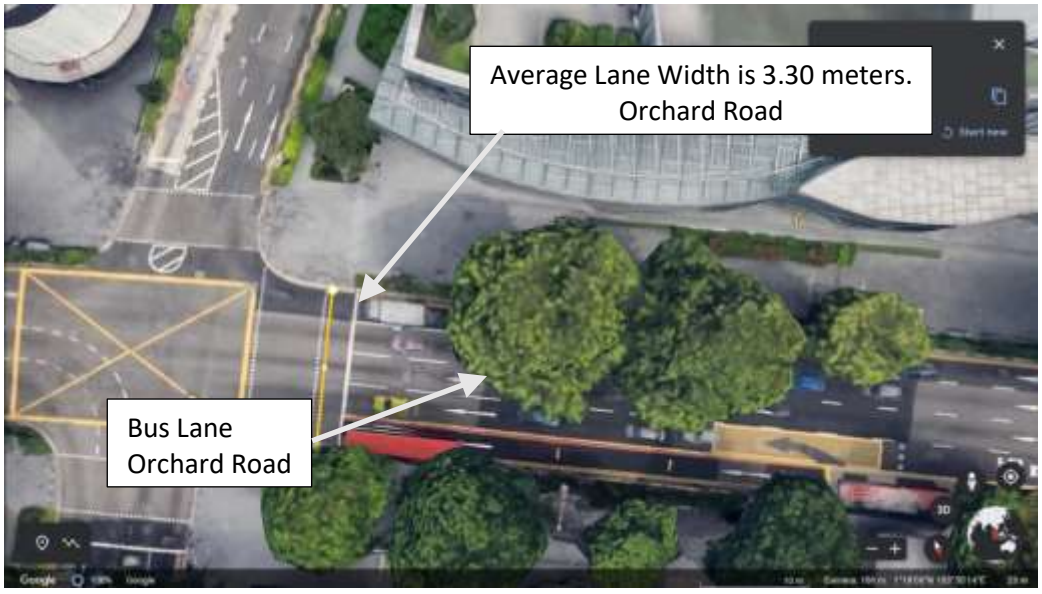
Figure 18.0 Google Earth

Figure 19.0 Google Earth

C. The Singapore Roadway Intersections

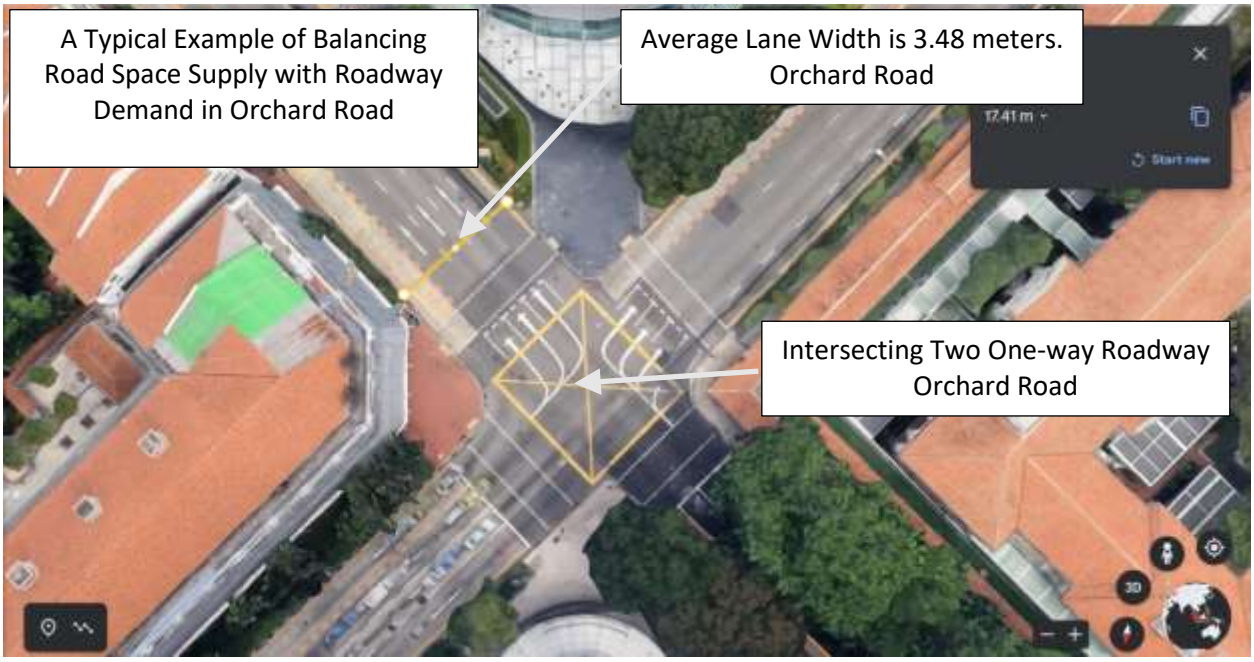
Singapore developed their traffic system using traffic modelling software. There are two (2) prestigious software being used today by the major cities of the world, the AIMSUN and the VISUM. Typically, the basic principle uses this traffic modelling software has been discussed above. The following pictures will show that only a well modelled traffic roadway result to simple traffic flow. Flyovers should be constructed sparingly justified.

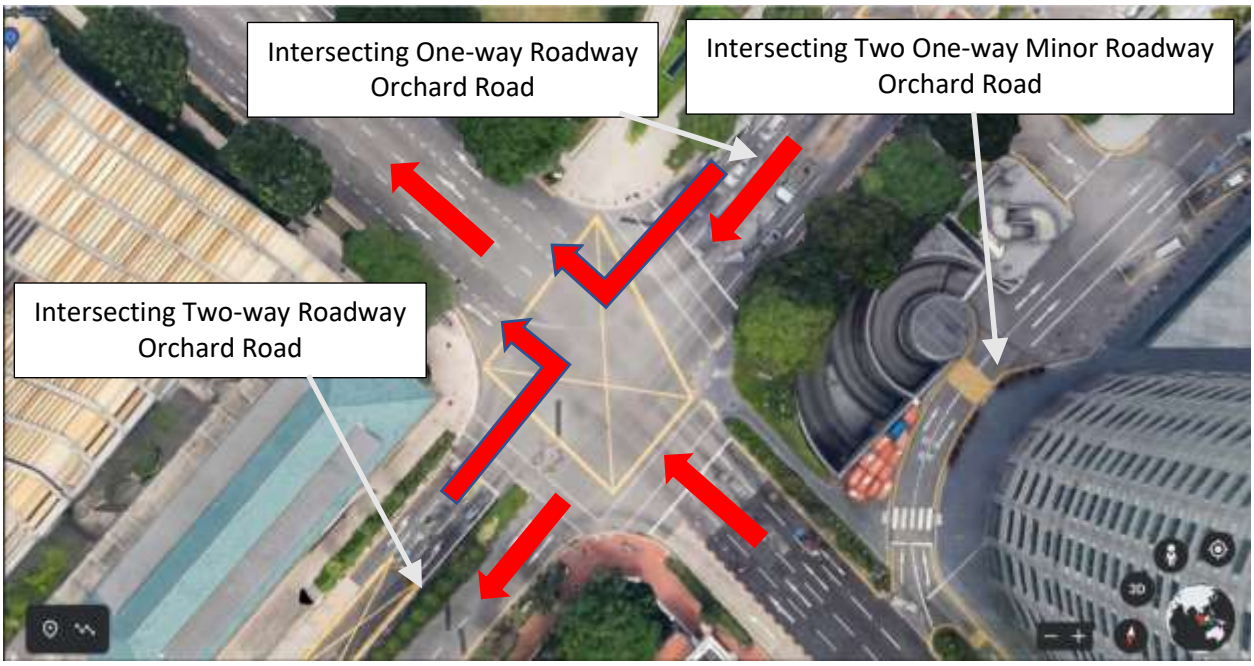

Average Lane Width is 3.2 meters
7-Lane One Way Orchard Road


Average Lane Width is 3.30 meters.
Orchard Road
Bus Lane
Orchard Road


Distance
14.3 m
Start new
Average Lane Width is 3.58 meters.
Orchard Road (End of Road)
3D


Distance
11.32 m
Start new
Average Lane Width is 3.77 meters.
Orchard Road (End of Road)
3D

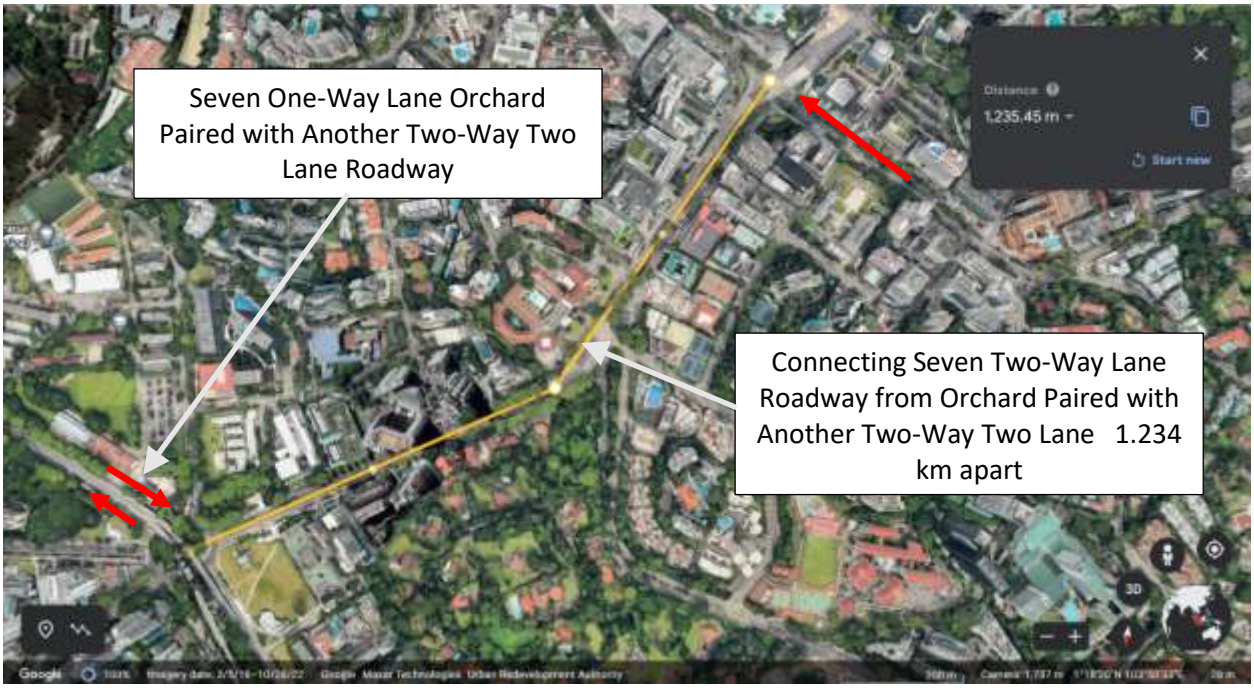




A combination of a one-way roadway and a two-way intersection

A Typical Example of Balancing Road Space Supply with Roadway Demand in Orchard Road

Seven One-Way Lane Orchard Paired with Another One-Way Four and Three Lane Roadway



EDSA and Metro Manila Roadways

"Metro Manila's Road length totals 4,889 km (1,166 km of national roads and 3,723 km of local roads) and includes a well-formulated trunk road network comprising radial (R-1 to R-10) and circumferential (C-1 to C-5) roads, with interchanges providing grade separations at several intersections"[6]. Singapore as a metro country has 9,500 single lane kilometers (for comparison with Metro Manila convert to lane length multiply by 4-lanes the national road equal to 4664 kilometers and add 7446 kilometers for city roads with two-lanes or a total of 12,100 single lane length for Metro Manila) of roads with a population of 5.64 million[7]. Metro Manila has a population of 14,667,089 persons[8]. Singapore has a ratio of 594 persons per kilometer while Manila has 1212 persons per kilometer. Land area of Singapore is 729 square kilometers while Metro Manila is 620 square kilometers. The Metro Manila area ratio would be 19.5 kilometer of roads per land area and Singapore would be 13.0 kilometer of roads per land area. In terms of length of roads per area Manila has slightly more roads than Singapore. This means we can make Singapore roadways as a Star standard to follow at least in principle.

[6] ADB Report and Recommendation of the President to the Board of Directors Project Number: 52181-001 November 2021 / Department of Public Works and Highways Regional National Road Length by Surface Type as of October 18, 2021

[7] Department of Statistics, Ministry of Trade & Industry, Republic of Singapore

[8] World Population Review and the Philippine Statistical Authority

Table 1.0 Roadway Data

City	Estimated average travel speed during peak times (km/h)	Resident Population (1)	Length of urban road lane network (km)	Meters per Capita
Bangkok	15 (3)	12,679,614	9,000	0.71
Manila	12 (4)	14,667,089	12,100	0.82
Hongkong	28(2)	7,413,000	8,772	1.18
Singapore	29 (1)	5,640,000	9,500	1.68

(1) UN World Urbanization Prospects
(2) www.td.gov.hk
(3) Bangkok Post
(4) MMDA 25.2 kph / Waze 12 kph

TABLE 3.2.2 DENSITY OF MAJOR ROADS BY CITY/MUNICIPALITY

CITY/MUNICIPALITY	ROAD LENGTH (KM.)	LAND AREA (SQ. KM.)	ROAD DENSITY (Km/Sq.Km.)
1. Manila	77.0	38.3	2.01
2. Pasay	23.7	14.0	1.69
3. Mandaluyong	14.3	11.1	1.29
4. Makati	37.4	29.8	1.26
5. Pasig *	36.0	32.6	1.10
6. Kalookan (South)	13.5	12.8	1.05
7. San Juan	5.9	5.6	1.05
8. Pateros *	2.5	2.6	0.96
9. Quezon City	148.8	166.2	0.90
10. Paranaque *	30.8	38.3	0.80
11. Navotas	7.9	10.4	0.76
12. Malabon *	16.7	23.4	0.71
13. Taguig *	12.3	33.7	0.69
14. Kalookan (North) *	22.9	43.0	0.53
15. Marikina *	20.3	38.9	0.52
16. Valenzuela *	24.0	47.0	0.51
17. Muntinlupa *	19.4	46.7	0.42
18. Las Pinas *	15.7	41.5	0.38
Total	540.0	635.9	0.85

Source: Study Team
Note : * denotes – City/Municipality located outside of C–4

Figure 20.0

There are 635 kilometers of roadways controlled by the city government and the remaining roadways is controlled by the National Government. In 2016 I made a proposal for an initial 245-kilometer major bus routes as shown in Table 2.0. More bus routes can be added depending on the demand for buses in city barangays. In Figure 20.0 is the methodology adopted by DPWH in 1951 to classify a balanced road network. The above proposed bus routes are located on the main road network of Metro Manila or I term it as traditional routes. Once this bus routes are established, more bus routes can be created based on the demand for buses in city barangays, Along the bus routes, bus stops are provided about every 350 meters at 200 meters from the furthest residence in

Table 2.0 Summary of Bus Stops and Number of Buses

Item No.	Description	Kilometers	Number of Bus Stops	Number of Buses (2 Buses per Stop)
1	MOA to Balintawak	24	96	192
2	Balintawak to MOA via R-4	19	76	152
3	SLEX corner EDSA and Congressional Avenue (via C-5)	28	112	224
4	EDSA corner R-1 via Airport Road to C-5	10	40	80
5	EDSA to Balintawak via Taft Avenue	15	60	120
6	Divisoria to Masinag via Aurora Boulevard	18	72	144
7	Bonifacio Ave to Regalado Highway via Quezon Boulevard	21	84	168
8	EDSA to R-10 via Araneta Avenue and Shaw Boulevard	19	76	152
9	EDSA to Roxas Boulevard via Buendia	6	24	48
10	EDSA to Roxas Boulevrd via Pasay Road	4	16	32
11	Tejeron to Pedro Gil via J.P Rizal Avenue	10	40	80
12	J.P Rizal to McKinley via Ayala Avenue	7	28	56
13	Baclaran to Balintawak via Rizal Avenue	12	48	96
14	BRT Lines Between MRT	24	24	72
15	BRT Lines Between LRT	12	10	18
16	BRT Lines Between Aurora Avenue Line	18	10	30
	TOTAL	**245**	**816**	**1624**

a barangay. Bus stops should be provided with electronic arrival and departure time of buses based on its destinations that can be accessed in cellphones. Dwell time should be limited to 3 minutes only.

The traditional jeepneys should be provided with their routes with jeepney stops. Taxis should be provided with designated taxi waiting stops. Replace bicycle lanes with

bicycle racks on buses assigned in major route. For motorcycles a separate designated routes should be provided.

Balanced Road Network

Below is a guide given by DPWH in balancing a road network established by a series of Executive Orders, Republic Acts and/or Presidential Decrees, of which the most fundamental one was Republic Act No. 917 known as the Philippine Highway Act of 1953. Excerpts described the methodology of a balanced road network as stated that, In order to establish a well-balanced major network, the initial major network is assessed by two (2) indicators, i.e “Network values” and “Accessibility”. If the indicators show imbalanced values, major road links are either added or deleted until these values are balanced[9].

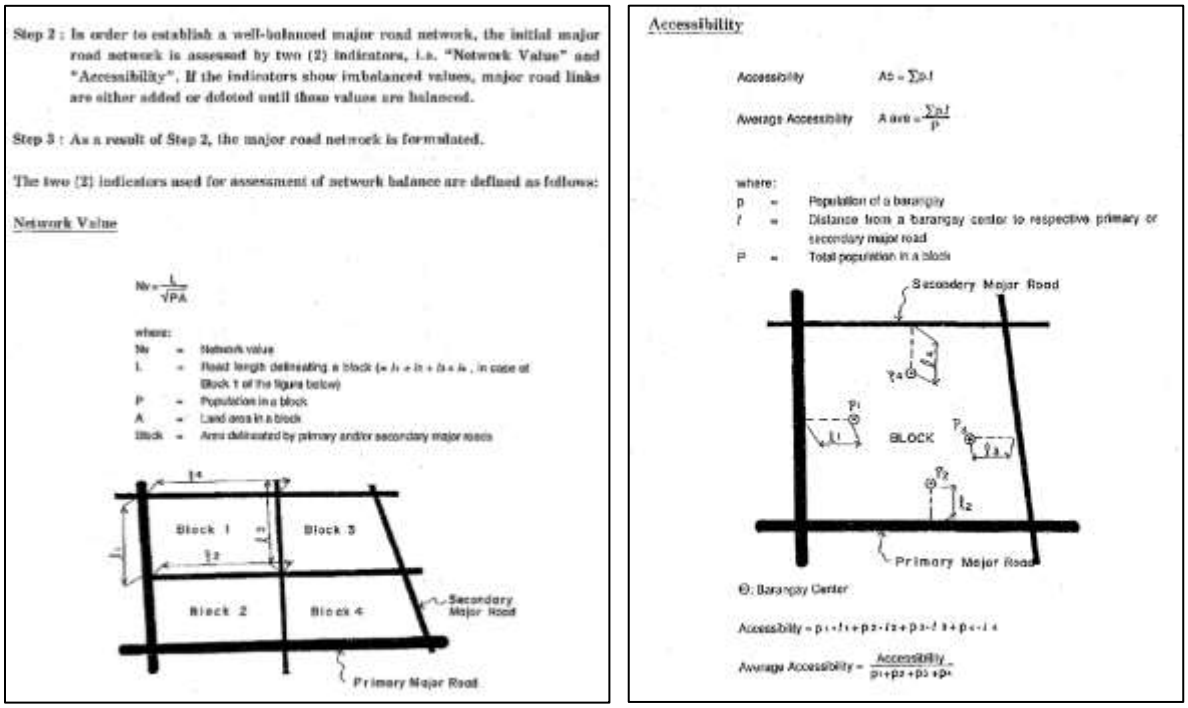


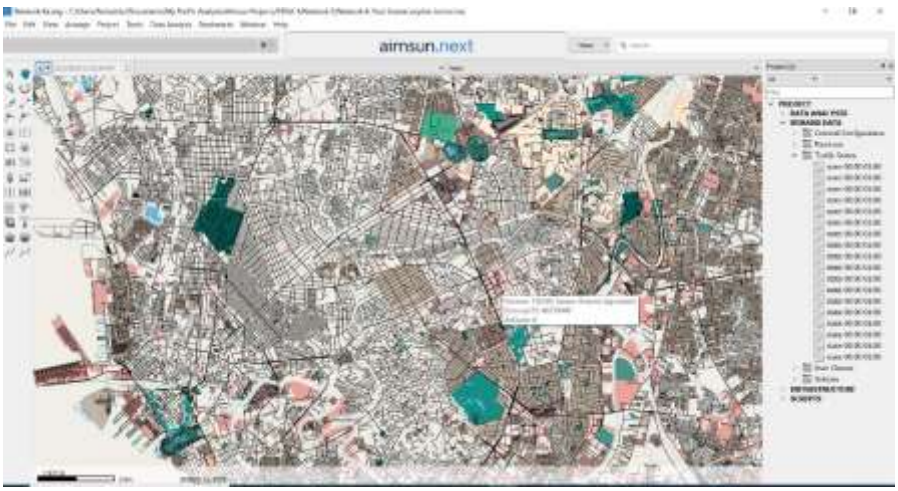
Figure 21.0

Today one of the internationally accepted methodologies to achieve a balanced road network is the use of modelling software such as AIMSUN. Within this integrated platform, data across all levels of modeling are contained in a single network file and applied to the appropriate and relevant modeling level. For example, the influence of control plans and traffic signs (Stop or Yield) is an important aspect that the modeler must maintain: the meso and micro levels explicitly consider the effect on driver behavior while the macro is sensitive to cost functions. Therefore, at the meso and micro levels, the modeler will input real signal timings and traffic control for the entire

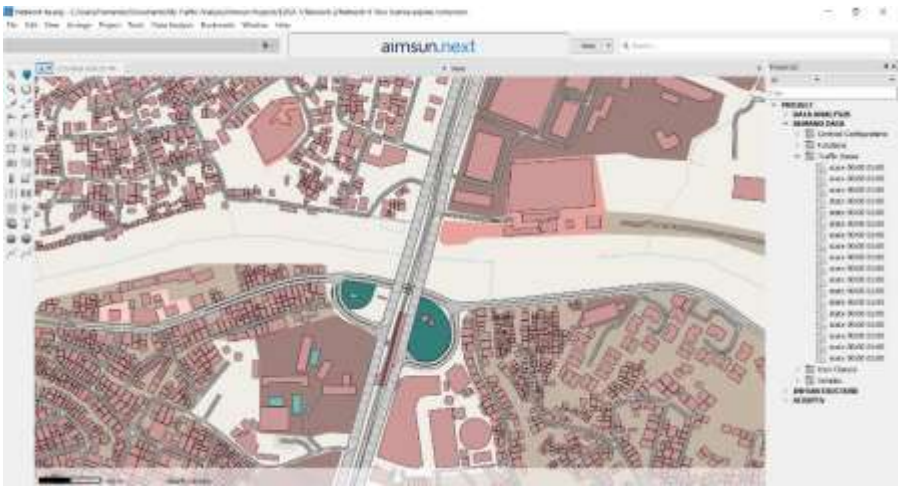
[9]Series of Executive Orders, Republic Acts and/or Presidential Decrees, of which the most fundamental one was Republic Act No. 917 known as the Philippine Highway Act of 1953

area being modeled at the meso, micro, or hybrid levels. At the macro level, the modeler will, at minimum, ensure that the Turn Penalty Functions (TPFs) appropriately reflect the effect of intersection control on delay. If desired, control plans can be used at the macro level as well, which will result in better macro paths to then feed into the first dynamic simulations, that allows seamless integration of control plans and traffic signs[10].

I bought AIMSUN for as part of my preparation to help MMDA in implement a One-Way EDSA but unfortunately Covid-19 happened, and it was discontinued. Below is one of my studies of EDSA



Study 1 EDSA SM North



Study 2 Guadalupe

[10] AIMSUN

D. Make EDSA One-Way Paired with C-5 and R-4

Maximizing the utilization of roads is an important traffic concept that Metro Manila should adopt immediately. We should make one-way roads paired with another one-way road. Makati Business District (MBD) is a good example of such principle and for almost 30 years it has serve its purpose until today. MBD 30 years ago is in almost in traffic gridlock. Today MBD is experiencing traffic congestion during rush hours because of EDSA, SLEX and the Skyway.

E. Summary and Suggestion

I wish to address my suggestion to the President and DOTR Secretary. Since your Office is asking the public to bear with the inconvenience of the work to be done on EDSA. Why not make EDSA one way as recommended by MMDA 7 years ago? I proposed a one-way Edsa 7 years ago (see YouTube "One way Edsa"). I explained the principle behind my concept to MMDA and was recommended for implementation by MMDA to the Metro Manila Council but was not approve. Technically speaking why, a one-way Edsa is because the road lane width of Edsa is not consistent. At the Guadalupe bridge the lane width is 2 meters only while the minimum standard of DPWH is 3.35 meters for urban highways for speeds up to 90 kph. This means vehicles running in tandem can have a maximum speed of 25 kph only. Most interchanges along Edsa intersections have reduce the lane width and the number of lanes. Because of these Edsa traffic congestion cannot be solved. The only option is to keep the traffic flow balanced, consistent and in accordance with DPWH and world standard is to make Edsa one way to include a predictive Metro Bus system and maximize if possible, all underutilized Metro Manila roadways. I strongly recommend as MMDA also recommend 7 years ago to make Edsa One Way paired by C-5 and R-4. I hope Sir that your office will consider my proposal for the convenience of the public.